

LIBBY STUDIES

CSS – Contaminant Screening Studies

2000 Phase 1 –

- Determine whether or not airborne levels in Libby require time-critical action to protect human health
- Obtain data on asbestos levels in potential source materials
- Identify appropriate analytical methods to screen and quantify asbestos in source material

2001 Phase II – refine risk estimates through additional data.

Findings:

- Asbestos occurs in ore and processed vermiculite obtained from the mine site outside of Libby
- Asbestos fibers from the mine site are hazardous to humans when inhaled
- Outdoor source materials include yard soil, garden soil, driveway material, and assorted mine waste material, while indoor source materials include dust and Libby vermiculite attic insulation.
- Disturbance can result in exposure to respirable asbestos fibers in air.
- Air concentrations of fiber generated by disturbance of source material may exceed OSHA standards and estimated cancer risks can exceed EPA's typical risk range by an order of magnitude or more

2002 CSS – CDM activities to determine presence or absence of potential LA sources at each property, and

- Identify property that require remediation (contain primary sources)
- Identify properties that require further inspection (contain indicators or secondary sources)
- Quantification of relative LA abundance in soils
- Identification of characteristics of properties that may increase changes of exposure to LA
- Identification of characteristics of properties that may aid in development of remedial decisions
- Determination of spatial trends

2002 Libby RI CSS Revision 1 – OU4

USFS Kootenai National Forest within study area

Screening and soil sampling – utilize Phase I (if adequate)

- Target denser populated areas
- Obtain data from perimeter properties

Purpose – contaminant trends (ie perimeter properties have less contamination.

- Visual Inspection – indoor and outdoor
- Verbal interviews
- Soil sampling
 - Only If vermiculite is observed in a large portion of property
 - Compositing sample based on use – up to 5 samples
- Sketch
 - Including soil sampling location

2007 Pre-Design/Removal Inspection Work Plan - CSS

(Conducting interior and exterior inspections)

- Property Selection
 - Grouped based on type and location of LA asbestos present
 - Interior removal only – includes bulk VCL removal based on visual or dust sample results
 - Exterior removal only – based on visual or soil sample results
 - Both
 - Remediation complete, no cleanup required
 - Access denied
- Inspections
 - Inspect attic and/or collect interior dust samples, as required
 - Dust samples collected if contaminated soils or visual vermiculite in SUA
 - Exterior inspection where previous inspection indicated LA in soils in yard, driveway of SUA
 - Where visible vermiculite in SUA team will sketch horizontal boundaries
 - Yards and driveways cleanup based on analytical results, unless in the form of tailings which will require excavation
 - Design Soil Sampling (5-point composite) to collect additional surface soil samples within contaminated areas to delineate the required area of excavation
 - CSS inspection if one was not completed
 - Site Walkthrough to confirm known contaminated areas
 - Exterior Inspection Checklist (EIC)
 - Detailed property sketch
- Supplemental Interior Inspection Checklist
 - Type of attics and access
 - Kneewalls, determine the construction
 - Attic floor construction
 - General condition of roof/attic area
 - Living Space Assessment
 - Configurations of rooms
 - Condition of interior ceilings and possible pathways for interior VCL exposure (ie closets, kitchen cabinets, light fixtures.
 - Electrical condition and access

- Mechanical systems – location and condition (ie exhaust pipes or flues)
- Plumbing systems
- Understructure
- Location and Quantity of VCI and non-VCI
- Determine is vermiculate containing building material

2006 Outdoor Ambient Air Monitoring OU4

Monitoring Program for outdoor air

- October 2006 (min. 1 year)
 - Monitoring locations
 - Fitness Center at City Hall
 - McGrade Elementary
 - Plummer Elementary
 - Rainy Creek Road and turnouts
 - Lincoln County Court House
 - Lincoln County Landfill
 - Station FA-1
 - Stimson Lumber Property
 - +27 properties where cleanup scheduled (1-2 days)
 - 36 samples per year per station
 - 0.8 and 0.45 μm pore size. Compare differences overtime in concentrations, 24 sets of pared samples
 - Height – 3' vs 5' , 24 paired samples

2007 Outdoor Ambient Air Monitoring Addendum – OU2 and OU6

- 4 sampling locations
- MET data from Libby Fire Cache (wind speed, direction, temp, humidity, precipitation)
- 24 samples per year/per station
- Height = 5'
- Filter size = 0.8 μm

2007 TAPE OU7

- 10-point per floor based on SUA dust samples (prioritized cpllection)
- 30-point soil sample based on SUA
- Visible vermiculite indoor and outdoor inspection
 - Identification of expanded, unexpanded vermiculite

May 2007 Dust Pilot

CDM needs to document how homes were selected to be part of this pilot and what are the documented LA concentrations and visible vermiculite indoors and outdoors at these properties.

Study questions–

- Is there variability in LA levels based on "accessibility"
 - Accessible
 - Infrequently accessed
 - Inaccessible
- Is there variability in LA levels on porous vs hard surfaces (prioritized sampling)
 - Porous accessible (12-point composite)
 - Non-porous accessible (12-point composite)
 - Infrequent (12-point composite)
 - Inaccessible (6-point composite)
- Whole floor composite (30-second) vs Whole floor composite (120-second)
- High Traffic areas – 3 point composite, 120-second
- Horizontal surfaces – 3-point composite, 120-second

Tech Memo 9 – Evaluation of Sources of Indoor Dust

Findings –

Soils =Dust?

- 14% of homes with detected LA levels in soil **also** had detected LA levels in indoor dust
- 9% LA in indoor dust detected with **ND** in soils
- LA levels in indoor dust were higher at properties with soils >575s/cm²

Soils = Entryway

- LA in outdoor soil potentially a contributor to LA in indoor dust – higher detection and average LA levels at properties with LA detected in soil.

Presence of Vermiculite insulation ≠LA Indoor dust

- 7% of buildings with VI had LA in indoor dust
- 8% of building without VI has LA in indoor dust

Presence of VI does not increase likelihood of indoor dust contamination with LA

Unenclosed Vermiculite Insulation ≠LA Indoor dust

- 7% detected LA in indoor dust with VI in attic
- 8% ND for LA in indoor dust with VI in attic

Visible vermiculite releases ≠higher LA in dust samples in close proximity

- Presence of visible VI not a predictor of LA contamination in a dust sample from that floor
- **Visible VI is usually restricted to a specific room or subarea and generally not widely distributed across the entire floor**
- Visible VI and/or detectable LA in indoor dust not a strong predictor of asbestos on other floors

Former miners ≠ LA Indoor dust

- Historic transport does not increase likelihood of current indoor dust contamination

Tech Memo 10 – Evaluation of the Relationship between Visible Vermiculite and LA Levels in outdoor soil

Results support the conclusion that the presence of visible vermiculite in soil indicates LA levels in soil with increasing concentrations.

- 11 samples Trace contamination = PLM detection frequency 36%
 - 13 samples Moderate contamination – PLM detection frequency 100%
- Absence of visible vermiculite is a good indicator that LA levels are not above 0.2%

2007 ABS – Indoor Sampling OU4

Site Selection = 6-7 properties in each of 4 categories

- Precleanup with outdoor cleanup
 - PLM results
 - VCS observed

Post cleanup no outdoor cleanup

- PLM results
- VCS observed

Sample Collection

- Indoor Air sampling
 - 2, 4-hour samples per home
 - 1 – passive behaviors
 - 1-active behaviors
- Indoor Dust Sampling
 - 1 composite sample
 - 10 points (4 accessible, 4 infrequent, 2 inaccessible)
- Outdoor Soil Sampling
 - 1 composite SUA's
 - 30-point
 - 1 composite non-SUA's
 - 30 sub-samples
- Sketch
- Collect MET data from Libby Station
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ABS –Activity Based Outdoor Air Exposures OU4

Site Selection

- 5-soil categories at post-cleanup sites
 - Clean fill
 - PLM = ND
 - With visual LA
 - No visual LA

- PLM B1 or B2
 - With visual LA
 - No visual LA
- 6-hour sampling event, 2 hours each
 - Period 1 – raking
 - Period 2 – child play
 - Period 3 – lawn mowing
- MET data collected (portable MET station)
- RAM data collected
 - Logs observed concentration of particulates
- Outdoor soil sampling
- 30-point composite sample from each activity area
- Sketch